

Translation

PATENT COOPERATION TREATY

PCT/EP2003/009648



PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

14 MAR

(PCT Article 36 and Rule 70)

| | | |
|--|---|--|
| Applicant's or agent's file reference 8369 WO E PA-FRI | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) | |
| International application No. PCT/EP2003/009648 | International filing date (day/month/year) 30 August 2003 (30.08.2003) | Priority date (day/month/year) 05 September 2002 (05.09.2002) |
| International Patent Classification (IPC) or national classification and IPC F16H 63/30 | | |
| Applicant ZF FRIEDRICHSHAFEN AG | | |

| |
|--|
| 1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36. |
| 2. This REPORT consists of a total of <u>5</u> sheets, including this cover sheet. <input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT). These annexes consist of a total of <u>2</u> sheets. |
| 3. This report contains indications relating to the following items: I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application |

| | |
|--|--|
| Date of submission of the demand 18 March 2004 (18.03.2004) | Date of completion of this report 24 November 2004 (24.11.2004) |
| Name and mailing address of the IPEA/EP Facsimile No. | Authorized officer Telephone No. |

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/EP2003/009648

I. Basis of the report

1. With regard to the elements of the international application:*

- ☒ the international application as originally filed
- ☒ the description:
pages _____ 1-9 _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☒ the claims:
pages _____, as originally filed
pages _____, as amended (together with any statement under Article 19
pages _____, filed with the demand
pages _____ 1-9 (fax) _____, filed with the letter of _____ 13 October 2004 (13.10.2004)
- ☒ the drawings:
pages _____ 1/2, 2/2 _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

| | | | |
|-------------------------------|--------|-----|-----|
| Novelty (N) | Claims | 1-9 | YES |
| | Claims | | NO |
| Inventive step (IS) | Claims | 1-9 | YES |
| | Claims | | NO |
| Industrial applicability (IA) | Claims | 1-9 | YES |
| | Claims | | NO |

2. Citations and explanations

Reference is made to the following document:

D1: DE 199 17 673 A (ZAHNRADFABRIK FRIEDRICHSHAFEN)
26 October 2000 (2000-10-26)

D1, which is considered to represent the closest prior art in relation to the subject matter of claim 1, discloses (the references in parentheses are to this document):

A two-stage planetary gear train with an input shaft (1) and an output shaft (2), a sun gear (12), a ring gear (18), a planet carrier (15) with planetary gears (13), a gearbox housing (3) and an electromagnetic shifting device with a sliding sleeve (19, 20, 21) for engaging a first gear, in which the ring gear may be coupled to the housing, and a second gear, in which the ring gear may be coupled to the sun gear (column 3, lines 9-15), wherein the sliding sleeve may be displaced by an electromagnet (31) consisting of solenoids (32) and an armature (33).

The subject matter of claim 1 thus differs from this known planetary gear train in that the armature is arranged in a rotatable, but axially fixed, manner to the sliding sleeve.

The electromagnetic shifting device known from D1 actually consists of an electromagnet arranged outside the gearbox housing with a mobile armature, the movement of which is transmitted by a lever mechanism from outside through the gearbox housing to a sliding sleeve arranged inside the gearbox housing.

The subject matter of claim 1 is therefore novel (PCT Article 33(2)).

The problem addressed by the present invention may therefore be considered that of providing the two-stage planetary gear train with a more compact shifting device which is as play-free as possible.

The solution to this problem proposed in claim 1 of the present application involves an inventive step (PCT Article 33(3)). The reasons are: since the armature of the electromagnet is fastened to the sliding sleeve in a directly rotatable and axially fixed manner, a lever mechanism for transmitting movement between the electromagnet and the sliding sleeve becomes redundant and the play necessarily associated with a lever mechanism is likewise eliminated. Moreover, the number of components is reduced, thereby giving a more compact design for the shifting device of the two-stage planetary gear train.

Claims 2-9 are dependent on claim 1 and therefore likewise meet the PCT requirements for novelty and inventive step.